

# Open Research Online

---

The Open University's repository of research publications and other research outputs

## Compression, convergence and conviviality: the contribution of new technologies to developments in radio from the 1980s

### Conference or Workshop Item

#### How to cite:

Bissell, Christopher (2016). Compression, convergence and conviviality: the contribution of new technologies to developments in radio from the 1980s. In: ICOHTEC2016, 26-30 Jul 2016, Porto, Portugal.

For guidance on citations see [FAQs](#).

© [not recorded]



<https://creativecommons.org/licenses/by-nc-nd/4.0/>

Version: Version of Record

---

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

---

[oro.open.ac.uk](http://oro.open.ac.uk)

# Compression, convergence and conviviality

the contribution of new technologies to developments in  
radio from the 1980s

Professor Chris Bissell

The Open University, UK

[chris.bissell@open.ac.uk](mailto:chris.bissell@open.ac.uk)

# Old paradigm

- Broadcasting
- Limited bandwidth
- Listener response:
  - Letters
  - Phone-ins
- Other media
  - Print (*Radio Times*, *Listener* ...)

# New paradigm

- Narrowcasting
- Flexible bandwidth
- Listener response:
  - Letters
  - Phone-ins
  - Email / texting
  - Social media (facebook, twitter, chat)
- Other media
  - Print (*BBC Magazines* ...)
  - Websites
  - Images
  - Videos

# Discussion points

- Convergence of audio and video (including telephony)
- Role of standards
- Compression technologies
- Military & civil technologies
- Social aspects
  - Communication between audience, content developers and broadcasters
  - Conviviality

# Standards

- MPEG suite
  - Moving picture experts group, established in 1988
  - Digital TV
  - mp3: MPEG-1/2 audio layer III
  - Digital analogue broadcasting
  - Now integral part of smart phones
- Advanced Audio Coding (AAC)
  - Default for *YouTube*, *iPhone*, etc
  - DAB+ (not forward compatible with MPEG DAB)
- Military / civil links

# Military / civil links

- Coding
  - Development of CDMA
  - Uses pseudo-random codes instead of time- or frequency multiplexing
  - Military: security
  - Civil: noise resilience and bandwidth efficiency
- Hardware advances
- 3G: wireless telephony, Internet access, video calls and mobile TV technologies ; IUT specification IMT-2000
- 4G: originally envisioned by *DARPA*; standardised 2008
  - Uses OFDMA rather than CDMA
  - IP-based

# Compression

<i>format</i>	<i>sampling frequency</i>	<i>quantization / bit rate</i>	<i>file size</i>
WAV	192 kHz	24 bits	329 MB
	96 kHz	24 bits	164 MB
	88.2 kHz	24 bits	151 MB
	48 kHz	24 bits	82.4 MB
	44.1 kHz	24 bits	75.7 MB
	44.1 kHz	16 bits	50.4 MB
MP3	44.1 kHz	320 kbps	11.4 MB
	44.1 kHz	256 kbps	9.15 MB
	44.1 kHz	192 kbps	6.86 MB
	44.1 kHz	128 kbps	4.57 MB
	44.1 kHz	92 kbps	3.43 MB

# How is it done?

- Human hearing characteristics
- Frequency compression
- Temporal compression
- Enormous file size reductions

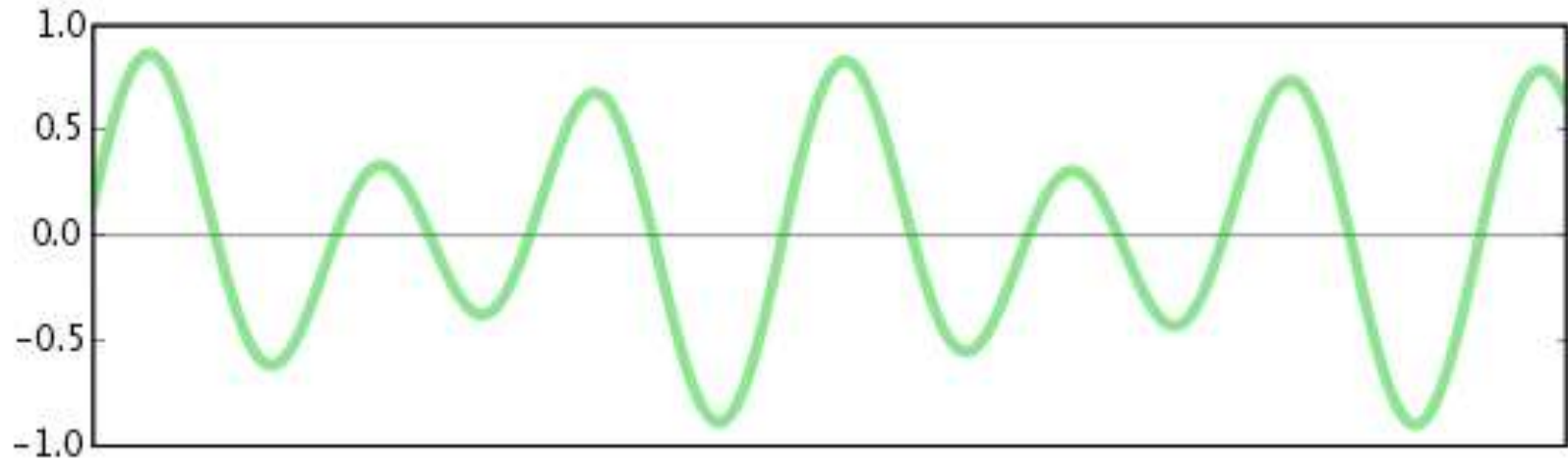


# Compression

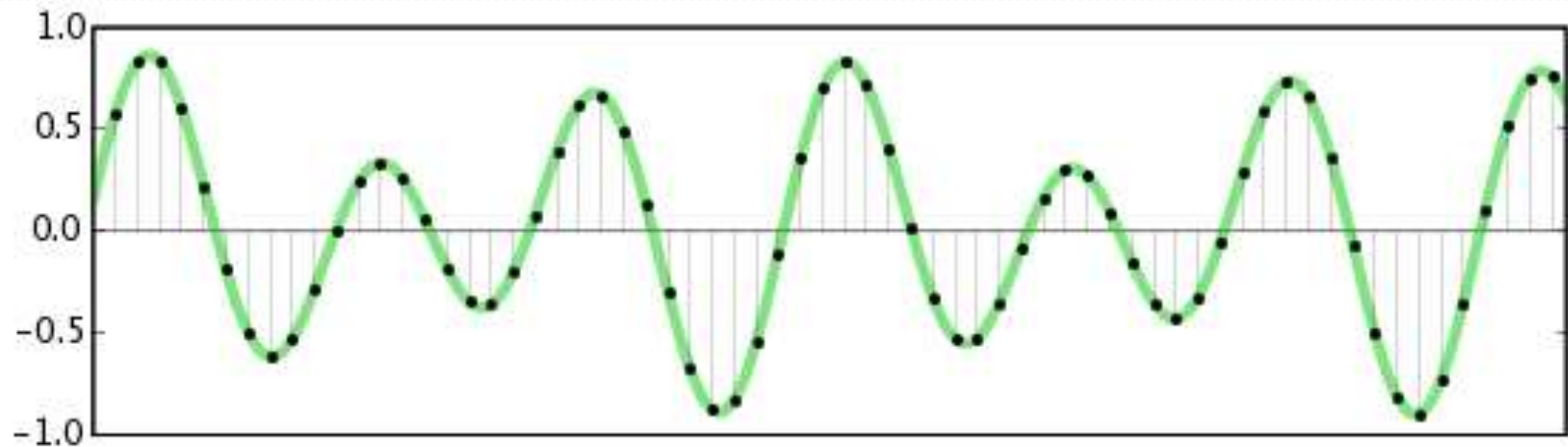
<i>format</i>	<i>sampling frequency</i>	<i>quantization / bit rate</i>	<i>file size</i>
WAV	192 kHz	24 bits	329 MB
	96 kHz	24 bits	164 MB
	88.2 kHz	24 bits	151 MB
	48 kHz	24 bits	82.4 MB
	44.1 kHz	24 bits	75.7 MB
	44.1 kHz	16 bits	50.4 MB
MP3	44.1 kHz	320 kbps	11.4 MB
	44.1 kHz	256 kbps	9.15 MB
	44.1 kHz	192 kbps	6.86 MB
	44.1 kHz	128 kbps	4.57 MB
	44.1 kHz	92 kbps	3.43 MB

# Digitisation

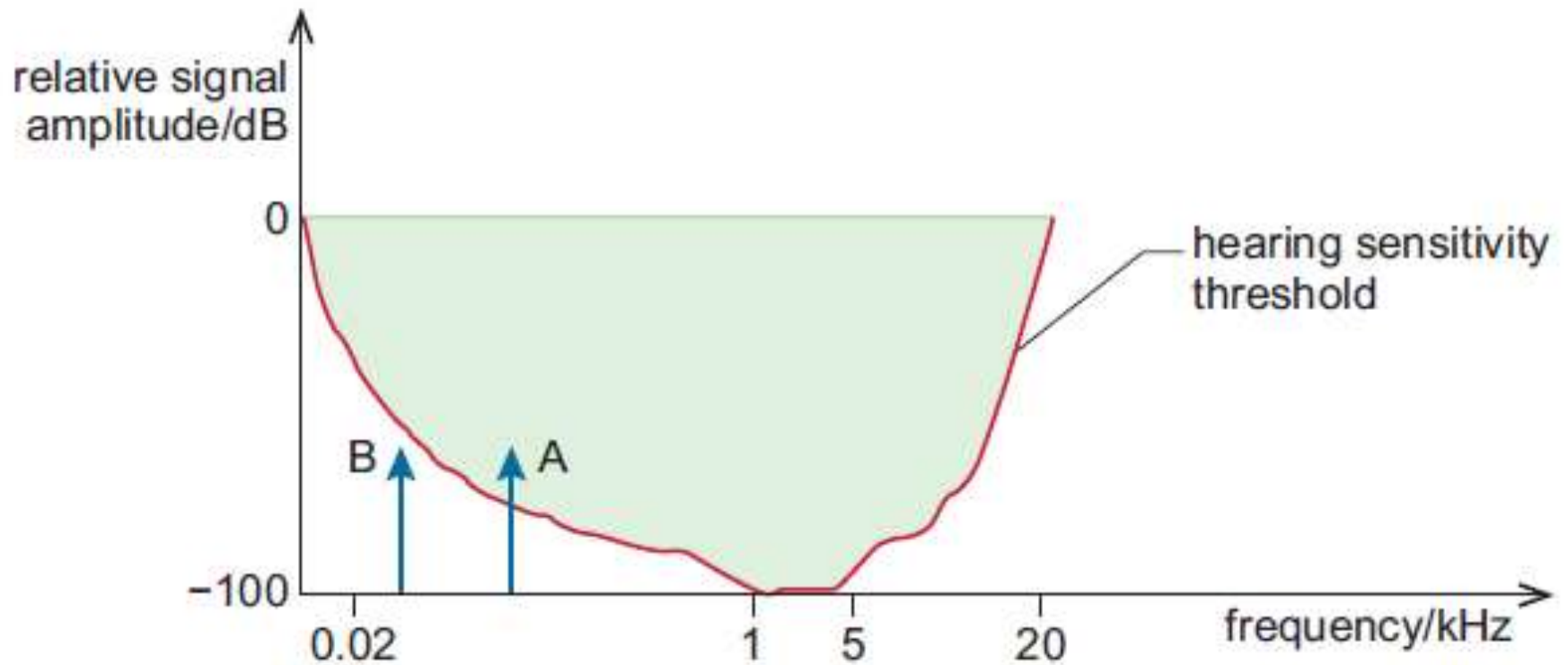
*analogue – transmit a continuous replica of original*



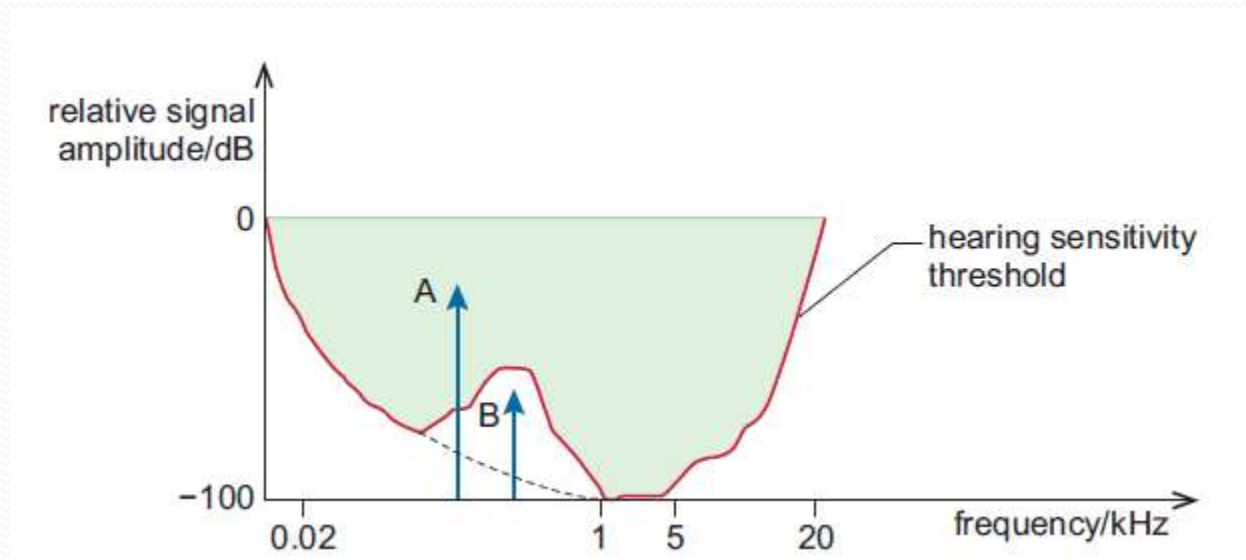
*digital – transmit a series of numbers (sampling rate depends on frequencies)*



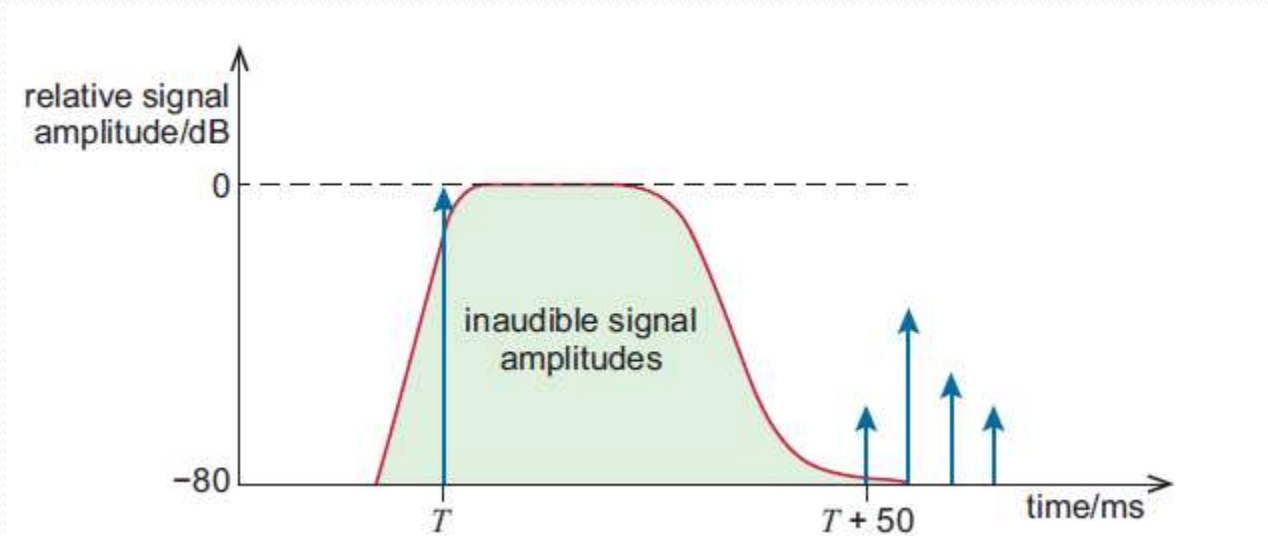
# Hearing threshold



# Frequency masking



# Temporal masking



# Mp3: a cultural artifact?

- technological artifacts ‘embody specific forms of power and authority’ (Winner, 1986)
- mp3 an attempt to solve the problem of exchangeable formats across segments of the media industry
- may require particular social and cultural systems of both intellectual property and listening
- ‘works for’ and is ‘worked on’ by a host of people, ideologies, technologies and other social and material (Sterne, 2002)
- ownership – like digital images – rather than simply consuming!

# Convergence

- In place of the old system is a new one, which has been called "convergence culture."
- Encompassing the hybridization of technologies and the collaboration of corporations on one hand, convergence also highlights the penetration of the audience itself into the spheres of production, promotion, and distribution.
- Many academics, commentators, and fans themselves see convergence culture as an ultimate victory ...
- But is it just free labour?

# Conviviality and on/off-line (examples from BBC, but common to many broadcasters)

- Podcasts
- Videos
- Streaming and downloads
- Message boards
- Twitter
- Facebook

## Some reasons

- Commonality of technologies
  - Web
  - MPEG / mp3 / DAB
  - MPEG video / DTV
- User knowledge
- Transferable user skills



Available now & Coming soon

Podcasts



### The Archers

Contemporary drama in a rural setting  
BBC RADIO 4



### **The Archers Omnibus**

The week's events in Ambridge  
BBC RADIO 4

# Video





On air 14:00 - 16:30

Afternoon on 3

2015 Verbier and Lucerne Festival Highlights



## Highlights



### BBC Proms 2016: Cello

See the cello in a new light as Sol Gabetta performs Elgar's Cello Concerto.

+ Add



### Composer of the Week: Mozart

Donald Macleod explores Mozart's childhood, spent as much away from Salzburg as at home.

+ Add







### Halévy's La Juive

Roberto Alagna stars in the critically acclaimed production from Bavarian State Opera.

+ Add



# Message boards

Discussion	Replies	Started by	Latest reply
 <b>Points of View Message Boards</b> ... Hello everyone, my name's Simon, and I'm the Series Producer of ...	972	<i>Simon Miller ...</i>	4 Weeks Ago
 <b>Alternative message boards</b> Prior to the closure of the Points of View message boards, some ...	3	<i>Simon Miller ...</i>	4 Weeks Ago
 <b>What's the music please?</b> Trying to identify music from a programme?Post your query here ...	3330	Peta	4 Weeks Ago
 <b>Background music in BBC TV ...</b> Hi all,this is a new thread for your comments on music used in ...	3241	Peter	4 Weeks Ago



# BBC

TWEETS  
4,670

FOLLOWING  
91

FOLLOWERS  
552K


LIKES  
3,598

LISTS  
24

**BBC** 

@BBC

Our mission is to enrich your life and to inform, educate and entertain you, wherever you are.

 TV. Radio. Online

 [bbc.co.uk](http://bbc.co.uk)

 Joined January 2009

 936 Photos and videos



Tweets

Tweets & replies

Media



BBC Retweeted



**BBC Archive** @BBCArchive · 2h

#OTD 2013: On her 16th birthday, Malala Yousafzai addressed the UN, campaigning for free education for every child



"One child, one teacher, one book and one pen can change the world"

# BBC Facebook



**BBC NEWS**

**BBC News** ✓  
@bbcnews

[Home](#) [About](#) [Videos](#) [Instagram](#) [More ▾](#)

Media/News/Publishing

🔍 Search for posts on this Page

PEOPLE >

**BBC NEWS** **BBC News** is live now.  
11 mins · Facebook Mentions · 🌐

Theresa May will be the new Prime Minister replacing David Cameron as Tory leader. Adam Fleming from BBC Daily Politics & Sunday Politics is answering your questions. What do you want to know? #FacebookLive

Contact Us

# Conclusion

- Audio compression based on psychoacoustic models has led to enormous file compression
- Storage requirements and transmission rates improved
- Time is shifted (catch-up audio and video)
- Social change
  - Social media
  - Citizen journalism / AV production
  - Conviviality and convergence